concentric bundles were produced in the proliferating pith. In these the phloem was always at the center of the bundle. Such bundles, the author points out, occur normally in the axes of the inflorescence of *Ricinus* and in the nodes. Superficial intumescences similar to those reported by VON SCHRENK[7] were produced on cauliflower by exposure of the plants to vapors of ammonia and of acetic acid mixed with alcohol.

The outgrowths here described all partake of the nature of intumescences frequently observed in plants. In some cases, indeed, as in the instance described of the complete filling of the pith cavity and the subsequent differentiation of a vascular ring, the outgrowth is excessive. This behavior leads the author to the belief that if the stimulus could be continually applied, one would have a condition resulting in the production of tissue masses not unlike those of crown galls. Since in his experiments the outgrowths also resulted from the presence of many substances not the product of parasites, the author is inclined not to attribute the effect to the specific chemical action of any compound, but seeks for an explanation in some property common to all the compounds regardless of chemical composition. Such a common characteristic he finds in their osmotic action, to which, rather than to chemical stimulation, he ascribes their effect. In this connection it is of interest to recall that intumescences have been produced by ATKINSON,[8] Miss DOUGLAS,[9] and STEINER[10] by subjecting plants to conditions increasing water absorption and diminishing transpiration; and by SORAUER, KÜSTER, VON SCHRENK, and others as a result of application of solutions. In the author's own work the intumescences were mostly the result of injection of solutions, but in some instances they resulted from the injection of water. It is improbable that the osmotic disturbances induced by the application or injection of water are the same as those effected by the application or injection of solutions. The fact that the various disturbances produce responses differing only in degree would seem to indicate that the causes determining the formation of intumescences have not yet been fully analyzed into their separate factors. It is not unlikely that different plants react differently in this respect. The experiments of STEINER would seem to indicate that such a possibility exists.—H. HASSELBRING.

Taxonomic notes.—GATES[11] has attacked the genus *Polygonatum*, which he says "has been in a very chaotic condition owing to the lumping of species, the transference of names, and the confusion of North American with European

---

[7] Rev. Bot. Gaz. **40**:390. 1905.

[8] ATKINSON, G. F., Oedema of the tomato. Cornell Univ. Agric. Exp. Sta. Bull. **53**:77–108. 1893.

[9] DOUGLAS, Miss G. E., The formation of intumescences on the potato. Bot. Gaz. **43**:233–250. 1907.

[10] Rev. Bot. Gaz. **40**:391. 1905.

[11] GATES, R. R., A revision of the genus *Polygonatum* in North America. Bull. Torr. Bot. Club **44**:117–126. *pls. 4–6*. 1917.

species." He recognizes 9 North American species, giving under each the full synonymy and citations of exsiccatae. The amount of change is indicated by the fact that the revision includes a new species combination, a new variety, and 3 new variety combinations.

KOIDZUMI[12] has published some studies of the plants of oriental Asia, describing new species and varieties. Notable among the genera is *Morus*, of which 25 species are enumerated, 4 of which are new.

MOORE,[13] in connection with descriptions of numerous new species of African Compositae, has established a new genus (*Paurolepis*) belonging to the Vernonieae.

NAKAI,[14] in continuing his studies of the flora of Japan and Korea, has described 21 new species, mostly in genera familiar in this country. The completed studies will furnish much additional evidence of the close relationship of the Japanese and North American floras.

PAYSON,[15] in studying the American perennial scapose species of *Draba*, recognizes 26 species, 14 of which are described as new. The new species are from Utah, Nevada, California, Oregon, Idaho, and adjacent Canada.

POVAH,[16] in concluding his studies of *Mucor*, has presented a taxonomic description of the 18 species investigated. In view of the fact that his experimental work showed that the species of *Mucor* are usually plastic organisms, varying especially with the substratum, it seemed desirable to attempt a standardization of cultural requirements, by investigating as many species as possible under the same cultural conditions. The 18 species described were studied from uniform, standard bread cultures, and 6 of them are described as new.

SMITH[17] has described a new genus (*Parasyringa*) of Oleaceae from China.

TRANSEAU[18] has published a list of the algae of Michigan, based chiefly upon collections made by him during the summer of 1915, in connection with the Michigan Biological Survey, supplemented by other collections. Since no work on Michigan algae has been published for a number of years, the records

---

[12] KOIDZUMI, GENITI, Contributiones ad floram Asiae Orientalis. Bot. Mag. Tokyo **31**:31–41. 1917.

[13] MOORE, SPENCER LEM., Alabastra diversa. XXVII. Jour.. Botany **55**:100–106. *pl. 547*. 1917.

[14] NAKAI, TAKENOSHIN, Notulae ad plantas Japoniae et Koreae. XIV. Bot. Mag. Tokyo **31**:97–112. 1917.

[15] PAYSON, E. B., The perennial scapose Drabas of North America. Amer. Jour. Bot. **4**:253–267. 1917.

[16] POVAH, ALFRED H. W., A critical study of certain species of *Mucor*. V. Taxonomic. Bull. Torr. Bot. Club **44**:287–312. *pls. 17–20*. 1917.

[17] SMITH, W. W., Note on *Parasyringa*, a new genus of Oleaceae. Trans. and Proc. Bot. Soc. Edinburgh **27**:93–96. 1916.

[18] TRANSEAU, E. N., The algae of Michigan. Ohio Jour. Sci. **17**:217–232. 1917.

for species are for the most part new to the state. The list includes 226 species, and among them there is a new species of *Oedogonium* (*O. americanum*), and new varieties of *Vaucheria geminata* and *Oedogonium undulatum*.

VAN ALDERWERELT,[19] in continuing his studies of Malayan pteridophytes, has described 27 new species of ferns, among them a new genus (*Campylogramma*), 11 new species of *Lycopodium*, and 7 new species of *Selaginella*.—J. M. C.

Direct reading potentiometers.—The electromotive force of the hydrogen electrode bears a logarithmic relation to the normal hydrogen-ion concentration H+ of the solution. Where large numbers of determinations are concerned, the calculation of the reaction of the solution in terms of normal acidity becomes laborious. An attempt to simplify the process was made by SÖRENSON, who introduced the P_h values. Since the P_h value is the negative logarithm of the hydrogen-ion concentration, the relation existing between these numbers and the usual method of expressing acidity in terms of normality is not always clear.

BOVIE[20] has devised a potentiometer which reads directly in terms of hydrogen-ion concentration. In the original article a full discussion is given of the method of operating the instrument, as well as of the construction of the dip electrode to be used in titrations. This instrument enables the operator to titrate a solution to a definite hydrogen-ion concentration and thus avoid the error due to misjudgment of the end point as found by the indicator method. Another advantage of the instrument is that it makes it possible to titrate two different acids in the same solution or to titrate successively the hydrogen ions of polyvalent acids or acid salts. It also makes possible the titration of such acids as boric acid, which give an end point on the alkaline side of the neutral point of distilled water. The author gives a number of other very useful applications for the instrument. The apparatus is very well adapted for making large numbers of determinations rapidly and with an accuracy sufficient for ordinary purposes.

Using logarithmic resistances instead of the logarithmic scale, BARTELL[21] has devised a similar apparatus, which avoids the sources of error in the BOVIE apparatus and gives a greater accuracy. It is not expected that this type of potentiometer will replace the older forms which are adapted to reading very small potentials.—R. B. HARVEY.

---

[19] VAN ALDERWERELT, Capt. C. R. W. K., New or interesting Malayan ferns. 8 and 9. Bull. Jard. Bot. Buitenzorg nos. 23 and 24. pp. 27 and 8. *pls.* 4. 1916 and 1917.

[20] BOVIE, W. T., A direct reading potentiometer for measuring and recording both the actual and total reaction of solutions. Jour. Med. Research **33**:297. 1915.

[21] BARTELL, F. E., A direct reading ionometer. Jour. Amer. Chem. Soc. **39**:630. 1917.